



Winter Weather Operations: Adapting to Changing Times and Roles

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1. INTRODUCTION:

Winter storms disruptive and dangerous; enormous costs due to travel delays, property damage, injuries and fatalities.

Science and technology of winter operations has greatly evolved in last 15 years; improved materials, machines, methods.

Snow and ice control is a primary function of municipal Public Works and State/ Province Departments of Transportation.

Public expectations and awareness higher due to the “wireless world.”

Most agencies have difficulty meeting expectations because of budgetary reductions, environmental regulations, loss of personnel from job eliminations and retirements.

2. ADAPTING TO CHANGE

Many agencies continue traditional practices due to “institutional inertia”.

Resistance to change because of indifference; management focuses more on engineering functions such as design, construction, maintenance.

Existing Plans and Manual often incomplete, obsolete or ignored.

Plans need to be flexible; review/ revise to meet evolving circumstances.

Plans should also incorporate Performance Measures.

The Manual documents the policies, protocols, practices and procedures that constitute the Concept of Operations.

3. THE PLANNING PROCESS

Planning involves analyzing and evaluating:

- what occurred,
- how it was handled,
- what did or did not work well,
- envisioning probable future events and conditions,
- what would be the response.

planning should be continuous:

- managers should constantly assess strengths and weaknesses,
- begin planning for next season at conclusion of current one,
- review historical weather patterns for locale,
- focus on 3-5 year horizon,
- evaluate resources; availability, capability and condition of equipment.

be realistic: don't commit to what will be unable to do

4. PRODUCT OF PLANNING: THE MANUAL

Purpose and Benefits of a Manual:

- a single, complete, current and comprehensive document,
- provides consistency and continuity of operations,
- promotes efficiency and effectiveness through best practices,
- improves training and safety,
- mitigates risk and liability exposure,
- reduces conflict and confusion,
- increases coordination among departments, agencies, other jurisdictions,
- informs elected officials and the public,
- guides procurement and allocation of resources,
- provides justification for budget requests.

Simply stated:

Ensures consistency and continuity by clearly communicating to staff, elected officials and the public the what, when, how and why of winter weather operations.

5. KEY ELEMENTS OF WINTER OPERATIONS PLAN AND MANUAL

- mission, goal, objectives,
- statutes, ordinances and regulations for winter weather operations,
- exemptions, exclusions and disclaimers,
- description of road and street classifications and Priority ranking,
- definitions of Levels of Service (LOS) for each Priority,
- general strategies and tactics,
- description of materials and application protocols,
- organizational structure,
- equipment, vehicles, machinery,
- facilities and communications systems,
- training regimen and schedule,
- rules regarding work schedules, pay computation, fitness for duty, etc.,
- public information, customer service, media relations.

Each agency determines the content, length and format that serves its purposes.

6. LEVELS OF SERVICE

Level of Service (LOS) is the foundation of Winter Operations Plan.

- no standard definitions of LOS for winter maintenance.
 - each agency determines its LOS based upon:
 - typical climate,
 - topography,
 - geographical size and density of jurisdiction,
 - roadway system size and configuration,
 - traffic patterns and volumes,
 - resources and capabilities,
 - political “considerations.”
 - be descriptive; illustrations are ideal.
- Important : “Do not promise what you cannot provide.”*

see: “Levels of Service in Winter Maintenance Operations: A Survey of State Practice”, Clear Roads Pooled Fund Study; WisDOT, 2009.)

7. STRATEGIES AND TACTICS : VARIABLE FACTORS

Adjust operations to actual conditions; advanced science and technology provides managers with better information and tools. Examples:

Categorize storms by severity:

- light
- moderate
- heavy
- severe
- extreme

Categorize precipitation by type:

- frost
- black ice
- Sleet/freezing rain
- thick ice
- Light, dry blowing snow
- heavy, wet snow
- slush
- hard snow pack

See NCHRP 526:
Snow and Ice Control: Guidelines for
Materials and Methods (2004)

8. ROUTE OPTIMIZATION

Many agencies use same routes for years with only minor adjustments. Existing routes may be outdated, inefficient; based on old data, priorities,

Route optimization :

- minimizes unnecessary turns, “dead-heading”, etc.,
- balances length (lane-miles/km) and cycle-times to equalize routes,
- accounts for topography (steep grades, curves) and congestion spots.
- follows logical sequences based on priorities,
- defines area boundaries based on distinct factors such as major roads, jurisdictional limits, geographical features,
- maximizes use of limited resources,
- Current routing software for routine activities like trash pickup and for changeable tasks such as deliveries not applicable for snow routes.

9. OPERATIONS

Pre-season:

- procuring materials, supplies, equipment, contractors,
- prepping vehicles and facilities; training, operator competitions,
- inspection of routes; check for and correct or identify hazards,
- install/inspect markers, signs, beacons, RWIS, snow fences, gates, etc.

In-Season:

- weather information sources and forecasts; notifications to crews, public,
- declaration of Snow Emergency; parking and traffic restrictions in effect.
- commencement of operations; tiered activations (partial-to-full staffing),
- tracking activity through operator reports, GPS, AVL, CCTV,**
- handling complaints, requests; assisting police/ fire with emergencies,

** see: Washington State DOT Snow and Ice Plan, Chapter 2

10. OPERATIONS

In-Season:

- plowing and spreading techniques, hauling from congested areas,
- handling hills, curves, intersections, bridges and overpasses, etc.
- responsibility for sidewalks, “windrows”, private streets, public parking lots...?
- end-of-storm push-back, benching, clearing, trouble spots,
- debris management (usually trees, branches downed by ice, heavy snow).

Post-Season:

- clean-up and inspection of equipment; note repairs needed,
- storage of surplus materials in environmentally safe manner,
- sweeping of streets and roads to remove excess materials,
- re-grade shoulders; patch potholes; fix guardrails, mailboxes, etc...
- Final reports and review.

Formal appreciation of entire staff important!

11. DOCUMENTATION

Complete and accurate records for each event :

- weather conditions; times that operations commence-cease,
- hours worked including contractors and support personnel, cost of labor,
- lane-miles/km traveled for plowing and treating per route,
- equipment miles/km and/or hours of use,
- quantities of materials used per route,
- equipment repairs, fuel used,
- damages, injuries, lost items,
- problems such as power or communication failures,
- number of complaints by route.

Snow and ice control one of the largest, costly and most visible operational programs by a Public Works agency. Accounting for total costs, including pre- and-post season activities, is critical to obtaining sufficient annual funding.

12. EQUIPMENT, FACILITIES, COMMUNICATIONS

Equipment: list by type, model and year, location and /or assignment.

Facilities: locations, capabilities (fuel, repairs, materials, temporary lodging or staging). Include dispatch and traffic management centers.

Communications:

- list of radio channels and use (such as individual districts, different departments, inter-agency, emergencies, etc.),
- list of radio call numbers and to whom assigned,
- phone/ fax numbers for main dispatch or command center, key personnel, support departments and agencies, other jurisdictions or government units, media. Designate numbers for only public to use,
- e-mail addresses and websites same as for above,
- list of RWIS, CCTV and other technological monitoring sites.

13. PUBLIC RELATIONS

Pre-season:

- media releases on how agency is preparing for winter,
- informational sessions at facilities, community centers, schools, etc.,
- website, social media sites, flyers included with utility or tax bills.

In-season:

- designated spokesperson(s),
- alerts as preparations begin for approaching storms,
- regular updates on operations,
- contact information for complaints, special requests, damage claims.

Post-season:

- Wrap-up reports.

Example: Minnesota DOT Annual Winter Maintenance Report

14. Summary

Planning for winter weather operations:

- requires strong involvement of and investment by management,
- must be done on a regular basis and given proper priority,
- consider climate change, technological innovations, environmental regulations, workforce evolution, budgetary constraints, traffic , infrastructure, etc.

Winter Weather Operations Manual :

- comprehensive in scope and accessible to all,
- standardizes operations,
- is a legal document; aids adjudicating claims and litigation,
- serves as a model for other emergencies and events.

See: “ Written Snow and Ice Control Plan and Policy Documents are Essential for Winter Maintenance Agencies “ by Duane Amsler, P.E., Salt Institute, 2007.